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(71)Applicant : HITACHI LTD

(72)Inventor : KANEKO YOSHIYUKI
ARAYA SUKEKAZU

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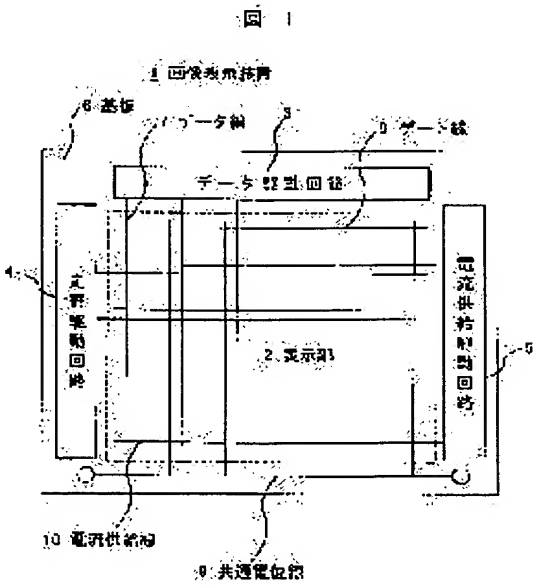
(54) PICTURE DISPLAY DEVICE AND DRIVING METHOD THEREFOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a picture display device and a driving method therefor by which picture quality is improved by suppressing a blur generated on the edge when displaying a moving picture in the case of driving an electro-optical element by an active matrix method.

SOLUTION: In order to display one picture on the picture display device 1, a quenching period for quenching the electro-optical element is formed to drive pixels after scanning plural gate lines 8. Namely, according to this invention, a quenching period for quenching the electro-optical element is formed between one frame and the following one frame to drive the pixels.



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CLAIMS

[Claim(s)]
[Claim 1] The image display device characterized by being formed in the shape of a matrix by two or more data lines which intersect two or more gate lines, forming the quenching period which it is the image display device equipped with the pixel containing an electro-optics component and a switching element, and carries out quenching of said electro-optics component after the scan of two or more of said gate lines in order to display one image, and said pixel driving.
[Claim 2] The image display device characterized by being formed in the shape of a matrix by two or more data lines which intersect two or more gate lines, forming the quenching period which carries out quenching of said electro-optics component within the one-frame period which is the image display device of the active-matrix mold equipped with the pixel containing an electro-optics component and a switching element, and displays one image, and said pixel driving.
[Claim 3] Make two or more data lines to which a picture signal is supplied by two or more gate lines to which a scan signal is supplied cross, and it is formed in the shape of a matrix. It is the image display device equipped with the pixel containing an electro-optics component and a thin film transistor. In order to display one image, after supplying said scan signal to said two or more gate lines The image display device characterized by forming the quenching period which said picture signal is supplied [period] to said two or more data lines, and carries out quenching of said electro-optics component to them while supplying said scan signal to said two or more gate lines, and said pixel driving.
[Claim 4] Make two or more data lines to which a picture signal is supplied by two or more gate lines to which a scan signal is supplied cross, and it is formed in the shape of a matrix. It is the image display device which displays the dynamic image equipped with the pixel containing an electro-optics component and a thin film transistor. In order to display one image, after supplying said scan signal to said two or more gate lines and making said electro-optics component emit light Form the quenching period which said scan signal is synchronized with said two or more data lines, and supplies the picture signal for quenching of said electro-optics component to said two or more data lines while supplying said scan signal to said two or more gate lines, and said pixel drives. The image display device characterized by preventing the edge dotage display of said dynamic image.
[Claim 5] Make two or more data lines to which a picture signal is supplied by two or more gate lines to which a scan signal is supplied cross, and it is formed in the shape of a matrix. It is the image display device equipped with the pixel containing an electro-optics component and a thin film transistor. The quenching period which carries out quenching of said electro-optics component within the one-frame period which displays one image is formed. The image display device characterized by making it synchronize with said scan signal, for the picture signal for quenching of said electro-optics component being supplied by said two or more data lines, and said pixel driving while said scan signal is supplied by said two or more gate lines at said quenching period.
[Claim 6] In the image display device equipped with the pixel which two or more data lines to which a picture signal is supplied by two or more gate lines to which a scan signal is supplied are made to cross, is formed in the shape of a matrix, and contains an electro-optics component and a thin film transistor The quenching period which carries out quenching of said electro-optics component within the one-frame period which displays one image is formed. The image display device characterized by forming the display-control controller which is synchronized with said scan signal and supplies

the picture signal for quenching of said electro-optics component to said two or more data lines while supplying said scan signal to said two or more gate lines at said quenching period.
[Claim 7] Make two or more data lines to which a picture signal is supplied by two or more gate lines to which a scan signal is supplied cross, and it is formed in the shape of a matrix. It is the image display device which displays the dynamic image equipped with the pixel containing an electro-optics component and a thin film transistor. The quenching period which carries out quenching of said electro-optics component between the one-frame periods which display the one-frame period which displays one image, and the following one image is formed. At said quenching period The image display device characterized by said pixel driving so that said scan signal may be synchronized with said two or more data lines and the picture signal for quenching of said electro-optics component may be supplied by said two or more data lines, while said scan signal is supplied by said two or more gate lines.
[Claim 8] In any 1 term of claims 3, 4, 5, 6, and 7 said pixel The 1st thin film transistor to which a scan signal is supplied through said gate line, The storage capacitance holding the picture signal supplied from said data line through said 1st thin film transistor, The 2nd thin film transistor to which said picture signal held with said storage capacitance is supplied, The image display device characterized by providing the electro-optics component which emits light according to the drive current which flows between said pixel electrodes and counterelectrodes when a pixel electrode is electrically connected with a common potential line through said 2nd thin film transistor.
[Claim 9] It is the image display device characterized by carrying said gate line, said data line, said 1st [the], the 2nd thin film transistor and storage capacitance, and said electro-optics component in the same substrate in claim 8.
[Claim 10] The drive approach of the image display device characterized by being formed in the shape of a matrix by two or more data lines which intersect two or more gate lines, forming the quenching period which carries out quenching of said electro-optics component after the scan of two or more of said gate lines in the drive approach of the image display device equipped with the pixel containing an electro-optics component and a switching element in order to display one image, and driving said pixel.
[Claim 11] The drive approach of the image display device characterized by being formed in the shape of a matrix by two or more data lines which intersect two or more gate lines, forming the quenching period which carries out quenching of said electro-optics component within the one-frame period which displays one image in the drive approach of the image display device of the active-matrix mold equipped with the pixel containing an electro-optics component and a switching element, and driving said pixel.
[Claim 12] In the drive approach of the image display device equipped with the pixel which two or more data lines to which a picture signal is supplied by two or more gate lines to which a scan signal is supplied are made to cross, is formed in the shape of a matrix, and contains an electro-optics component and a thin film transistor In order to display one image, after supplying said scan signal to said two or more gate lines The drive approach of the image display device characterized by forming the quenching period which said picture signal is supplied [period] to said two or more data lines, and carries out quenching of said electro-optics component to them while supplying said scan signal to said two or more gate lines, and driving said pixel.
[Claim 13] In the drive approach of the image display device which displays the dynamic image equipped with the pixel which two or more data lines to which a picture signal is supplied by two or more gate lines to which a scan signal is supplied are made to cross, is formed in the shape of a matrix, and contains an electro-optics component and a thin film transistor In order to display one image, after supplying said scan signal to said two or more gate lines and making said electro-optics component emit light Form the quenching period which is synchronized with said scan signal and supplies the picture signal for quenching of said electro-optics component to said two or more data lines while supplying said scan signal to said two or more gate lines, and said pixel is driven. The drive approach of the image display device characterized by preventing the edge dotage display of said dynamic image.
[Claim 14] In the drive approach of the image display device equipped with the pixel which two or more data lines to which a picture signal is supplied by two or more gate lines to which a scan signal is supplied are made to cross, is formed in the shape of a matrix, and contains an electro-optics

component and a thin film transistor The quenching period which carries out quenching of said electro-optics component within the one-frame period which displays one image is formed. The drive approach of the image display device characterized by making it synchronize with said scan signal, supplying the picture signal for quenching of said electro-optics component to said two or more data lines, and driving said pixel while supplying said scan signal to said two or more gate lines at said quenching period.

[Claim 15] In the drive approach of the image display device which displays the dynamic image equipped with the pixel which two or more data lines to which a picture signal is supplied by two or more gate lines to which a scan signal is supplied are made to cross, is formed in the shape of a matrix, and contains an electro-optics component and a thin film transistor The quenching period which carries out quenching of said electro-optics component between the one-frame periods which display the one-frame period which displays one image, and the following one image is formed. At said quenching period The drive approach of the image display device characterized by making it synchronize with said scan signal, supplying the picture signal for quenching of said electro-optics component to said two or more data lines, and driving said pixel while supplying said scan signal to said two or more gate lines.

[Claim 16] In the drive approach of the image display device which displays the dynamic image equipped with the pixel which two or more data lines to which a picture signal is supplied by two or more gate lines to which a scan signal is supplied are made to cross, is formed in the shape of a matrix, and contains an electro-optics component and a thin film transistor The quenching period which carries out quenching of said electro-optics component between the one-frame periods which display the one-frame period which displays one image, and the following one image is formed. At said quenching period While supplying said scan signal to said two or more gate lines, make it synchronize with said scan signal, supply the picture signal for quenching of said electro-optics component to said two or more data lines, and said pixel is driven. The drive approach of the image display device characterized by impressing a reverse bias electrical potential difference to said electro-optics component which quenched.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the image display device and its drive approach of the active-matrix mold controlled by switching elements, such as a thin film transistor which controls luminescence actuation of the electro-optics component made to emit light by passing a drive current to luminescence thin films, such as organic-semiconductor film.
[0002]
[Description of the Prior Art] In recent years, the need of a personal computer, car navigation, a Personal Digital Assistant, information communication equipment, or these compound products is growing with arrival of a highly information-oriented society. The display of a thin shape, a light weight, and a low power is suitable for these products, and the display by electro-optics components, such as liquid crystal display or spontaneous light type EL (electroluminescence) component or an LED (light emitting diode) component, is used for them.
[0003] Since the features, like that visibility is good, that a viewing-angle property is large, and it is suitable for a movie display by high-speed response are shown in the display by the latter spontaneous light type electro-optics component, graphic display will be especially considered to be suitable from now on which will become main. As for the expectation for an OLED display, in two, the rapid improvement in the luminous efficiency of the organic EL device which makes the organic substance in recent years a luminous layer especially, or an organic LED component (hereafter, these are named generically and OLED is called), and progress of the network technique which enables an image communication link, an interval just increases.
[0004] In order to raise the power efficiency in an OLED display, the active-matrix drive by the thin film transistor (TFT is called hereafter) is effective like the after-mentioned. The technique of producing an OLED display as active-matrix structure, and driving it is indicated by JP,4-328791,A, JP,8-241048,A, and United States patent USP No. 5550066, and is indicated by the international patent official report WO 98/No. 36407 etc. about driver voltage relation.
[0005] The typical pixel of an OLED display controls the luminescence brightness of OLED by the active component drive circuit which consists of two TFT(s) (a switch transistor and driver transistor) and one storage capacitance. A pixel forms the matrix of a m line n train for the n data lines to which a picture signal is supplied, and the m scanning lines (gate line) to which a scan signal is supplied, and arranges a pixel near [that / intersection] each.
[0006] In order to drive a pixel, a sequential-scanning signal (gate voltage) is impressed to the gate line of m lines, the turn-on of the switching transistor is carried out, a vertical scan is finished once within the one-frame period Tf, and a turn-on electrical potential difference is again impressed to the gate line of the 1st line.
[0007] In this drive scheme, the time amount by which a turn-on electrical potential difference is impressed to one gate line becomes below Tf/m. Generally, 1 / about 60 seconds are used as a value of the one-frame period Tf. When the turn-on electrical potential difference is impressed to a certain gate line, all the switching transistors connected to the gate line will be in an ON state, and a picture signal (data electrical potential difference) is impressed to the data line of n train at coincidence synchronizing with it. This is called the so-called line-sequential-scanning method, and, generally is used with active matrix liquid crystal.

[0008] A data electrical potential difference is stored in storage capacitance (capacitor), while the turn-on electrical potential difference is impressed to the gate line, and an one-frame period is mostly maintained at those values. The current value which specifies the gate voltage of a driver transistor, therefore flows a driver transistor is controlled, a fixed current flows OLED, and luminescence produces the electrical-potential-difference value of storage capacitance. If an electrical potential difference is impressed to OLED, it is usual that it is 1 or less microsecond, and the response time until luminescence starts can follow in footsteps of the quick image (dynamic image) of a motion.
[0009] Now, the active-matrix drive has realized the well head by luminescence being performed for an one-frame period. The difference is clear if this is compared with the effectiveness by the passive-matrix drive which links the diode electrode of OLED with a vertical-scanning line and a horizontal scanning line directly, respectively, and drives it, without preparing TFT.
[0010] Since a current flows to OLED only at the period when the vertical-scanning line is chosen in the passive-matrix drive, in order to obtain brightness equivalent to luminescence of an one-frame period only by luminescence of the short period, compared with a active-matrix drive, one times the luminescence brightness of the abbreviation perpendicular number of scanning lines is needed. It does not escape that must enlarge driver voltage and a drive current inevitably, power consumption losses, such as generation of heat, become large, and power efficiency falls to it.
[0011] Thus, the active-matrix drive is considered to be dominance from a viewpoint of low-power-izing compared with the passive-matrix drive.
[0012]
[Problem(s) to be Solved by the Invention] Therefore, as for the conventional technique, OLED has been considered that a high-speed response is suitable for an animation. However, the active-matrix drive of OLED by the conventional technique is the same as the drive approach of a liquid crystal display (LCD), it displays for an one-frame period, that is, a pixel is means of displaying of a hold mold which makes OLED emit light.
[0013] About LCD, it originates in the means of displaying of a hold mold, and the phenomenon in which the edge of an animal object fades at the time of animation display is not avoided as indicated by 26 pages (June, 1996) from "Institute of Electronics, Information and Communication Engineers technical research report" EID 96-34 and 19 pages.
[0014] Although the technical problem of edge dotage of a dynamic image is pointed out about LCD, the cause of generating is for a hold display. Therefore, if the OLED is indicated by hold by active-matrix drive, edge dotage of a dynamic image will become a problem similarly.
[0015] Thus, in case the active-matrix drive of the electro-optics component is carried out like OLED, consideration is not made by the edge dotage at the time of animation display, but the conventional technique has the trouble that image quality deteriorates.
[0016] In case the purpose of this invention carries out the active-matrix drive of the electro-optics component, it is to offer the image display device which can control the edge dotage at the time of animation display, and can raise image quality, and its drive approach.
[0017]
[Means for Solving the Problem] The place by which it is characterized [of this invention] is to form the quenching period which carries out quenching of the electro-optics component after the scan of two or more gate lines, and have made it drive a pixel, in order to display one image. When it puts in another way, this invention is to form the quenching period to which quenching of the electro-optics component is carried out between one frame and the following one frame, and have made it drive a pixel.
[0018] The desirable operation gestalt of this invention forms the quenching period which carries out quenching of the electro-optics component within the one-frame period which displays one image, and it is made to drive a pixel.
[0019] Since the quenching period which carries out quenching of the electro-optics component after the scan of two or more gate lines is form and he is try to drive a pixel in order that this invention may display one image , the integral of a white background is lose at the time of the look migration during this quenching period , and dotage of an edge , i.e. , the display property of an animation , is improve sharply .
[0020]

[Embodiment of the Invention] The gestalt of operation of this invention is explained with reference to a drawing. First, the configuration of an image display device is explained and the drive approach is described below.

[0021] Drawing 1 is the block diagram showing the layout of the whole image display device 1 typically, and drawing 2 is the representative circuit schematic of the active matrix constituted by the display of drawing 1 .

[0022] drawing 1 -- setting -- an image display device 1 -- a substrate 6 -- the display 2 is mostly constituted by the center section. The data drive circuit 3 which supplies a picture signal to the data line 7 is established in the display 2 bottom, and the scan drive circuit 4 which supplies a scan signal (gate voltage) to left-hand side to the gate line 8 is formed. Moreover, the current supply source drive circuit 5 is established in right-hand side. These drive circuits 3, 4, and 5 consist of the shift register circuit which consists of complementary circuits by TFT of an N channel mold and a P channel mold, a level-shifter circuit, an analog switch circuit, etc.

[0023] Two or more gate lines 8 and two or more data lines 7 which made it extend in the direction in which it crosses to the extension direction of the gate line 8 are formed by the image display device 1 on the substrate 6 like the active matrix of a liquid crystal display. As shown in drawing 2 , the pixel 20 is arranged in the shape of a matrix at the crossing place of the gate line 8 (G1, G2, --, Gm) and the data line 7 (D1, D2, --, Dn).

[0024] The gate electrode of the switch transistor 21 which consists of TFT of an N channel mold is connected to the gate line 8, one side of the source electrode of the switch transistor 21 and a drain electrode is connected to the data line 7, and another side is connected to the end of storage capacitance 23 so that a pixel 20 may be expanded to drawing 3 and may be shown. The end of storage capacitance 23 is connected also to the gate electrode of the driver transistor 22 which consists of TFT of an N channel mold.

[0025] The source electrode of the driver transistor 22 is connected to the common potential line 9 which extends in the same direction as the data line 7, and the drain electrode is connected to one electrode of OLED24. It connects with the current supply source line 10 common to all the pixels 20, and the electrode of another side of OLED24 is maintained at potential Va. As for OLED24, luminescence in an OLED layer serves as the structure where an anode plate is taken out outside through the glass substrate with which TFT was formed by usually being formed with a transparent electrode.

[0026] In this configuration, if the switch transistor 21 is turned on with the gate line 8 (G1, G2, --, Gm) and the scan signal added, a picture signal will be written in storage capacitance 23 through the switch transistor 21 from the data line 7. Therefore, the gate electrode of the driver transistor 22 is held at the potential which is equivalent to a picture signal with storage capacitance 23, even if the switch transistor 21 is turned off.

[0027] The driver transistor 22 continues being maintained at the drive condition in the grounded source mode in which it excels in constant current nature, and the current from the current supply source line 10 flows to OLED24. OLED24 is maintained by the luminescence condition. It depends for the luminescence brightness at this time on the image data written in storage capacitance 23. A luminescence halt of OLED24 is made by making the driver transistor 22 into an OFF state.

[0028] Next, the drive approach of an image display device is explained using drawing 4 and drawing 5 .

[0029] The configuration of the driving gear which drives the image display device by this invention to drawing 4 is shown.

[0030] In drawing 4 , the thing of the same sign as drawing 1 shows a considerable object, and a timing control signal (clock signal) is given to the scan drive circuit 4 and the data drive circuit 3 from the display-control controller 11. As for the data drive circuit 3, a picture signal is also given from the display-control controller 11.

[0031] The timing (clock frequency) of the display-control controller 11 is adjusted by the timing equalization circuit 12. The timing equalization circuit 12 is set as the clock frequency [-izing / the fundamental frequency of one frame / the clock frequency / 4 time]. Thereby, and it makes timing of the frame start control signal of the shift register in both the drive circuits 3 and 4 t= 0, Tf/4, Tf, 5Tf/4 --. [the display-control controller 11] [data read-out from an image memory 13] [4 time]

[0032] In this configuration, the gate lines G1 and G2 and the gate voltage VG1, VG2, --, VGm which carries out the turn-on of the switch transistor 21 to --Gm one by one as shown in drawing 5 from the scan drive circuit 4 are applied. Gate voltage VG1, VG2, --, VGm changes from the electrical-potential-difference value (low-battery level) VGL to the electrical-potential-difference value (high-voltage level) VGH.
[0033] On the other hand, synchronizing with gate voltage VG1, VG2, --, VGm, the data electrical potential differences VD1, VD2, --, VDn of a picture signal are applied to the data lines D1, D2, --, Dn from the data drive circuit 3. As for the picture signal electrical potential differences VD1, VD2, --, VDn, the value between the electrical-potential-difference value (high-voltage level) VDH and the electrical-potential-difference value (low-battery level) VDL is set up. The electrical-potential-difference value VDL is usually below the electrical potential difference of the common potential line 9. The electrical potential difference Va of the current supply source line 10 and the electrical potential difference of the common potential line 9 are kept constant.
[0034] Thus, although driven, this drive approach is the same line sequential scanning as the conventional technique.
[0035] Now, in this invention, the period which the scan of one screen (one image) takes is shortened with one fourth of the one-frame periods Tf. Therefore, the selection time amount per one of the gate line 8 becomes short with Tf / 4m. If the scan of one screen finishes and then the gate line G1 is chosen, the data electrical potential differences VD1, VD2, --, VDn of the electrical-potential-difference value VDL which makes the driver transistor 22 an OFF state will be shortly impressed to all the data lines D1, D2, --, Dn.
[0036] if it is made such an electrical-potential-difference scheme -- about [of an one frame period] -- a luminescence period comes one fourth and a quenching period (nonluminescent period) comes the three fourths remaining. In order to prevent that the effectual luminescence time amount of OLED24 becomes short, and a display image becomes dark, it is made for the peak value of a data electrical potential difference to serve as a 4 times as many current as this. the high-speed response which OLED24 has although the period allotted to luminescence is set to about 4ms since the value of the one-frame period Tf is about 16ms -- therefore, this period -- all can be covered mostly and light can be emitted.
[0037] Thus, although an image display device is driven, it explains that edge dotage of a dynamic image can be controlled.
[0038] First, in order to make an understanding easy, it explains using drawing 6 that edge dotage of an animation occurs.
[0039] As shown in drawing 6 (a), a black rectangle considers the image which moves in the right direction of an arrow head with constant speed from the illustration left in a white background as a dynamic image. In this dynamic image, when a hold mold is displayed, the contents of a display are rewritten for every one-frame spacing, and its attention is expanded and paid about 1 level Rhine of the part which contains the edge of a dynamic image with careful attention to the point that one-frame period maintenance of those contents of a display is carried out.
[0040] Drawing 6 (b) shows time amount change of this expansion part typically for every Tf. As shown in drawing 6 (b), the rectangular edge section is displayed moving stair-like to time amount progress. Drawing 6 (b) shows the example which 4 pixels of edges move per frame.
[0041] As shown in the arrow head A of drawing 6 (b), the eyes of the user who looks at this display screen follow a dynamic image, and carry out look migration continuously. Since a white background will also be recognized in the middle of this look migration, the luminance signal of the dynamic image which a user perceives serves as an integral value of these white signals and a black signal. That is, the edge section of a black rectangle will fade.
[0042] On the other hand, drawing 7 showed how the image by the drive of this invention appears about the pixel of one line of drawing 6 (b).
[0043] In drawing 7 , although quenching of between t=t0+Tf(s) is carried out from time-of-day t=t0+Tf/4, since the integral of a white background is lost at the time of the look migration during this quenching period, dotage of an edge, i.e., the display property of an animation, will be improved sharply.
[0044] In addition, with the gestalt of above-mentioned operation, although the ratio of a

luminescence period and a quenching period was set to 1:3, since there is no image quality degradation in the display property of CRT which looks at the afterglow (<-3ms) of a fluorescent substance, effectiveness of this invention can be enlarged more by shortening a luminescence period further by the timing equalization circuit 12.
[0045] The gestalt of other operations of this invention is shown in drawing 8 .
[0046] In drawing 8 , a different point from the gestalt of operation of drawing 4 is forming the current supply source line drive circuit 15, and having made it put under control of the display-control controller 11. In each current supply source line 10, the switch 16 which is interlocked with the gate voltage for quenching and changes the supply voltage of the current supply source line 10 as shown in drawing 9 is formed.
[0047] The pixel matrix Fig. of a display 2 is shown in drawing 10 . A different place from drawing 2 in drawing 10 is having prepared the current supply source lines A1 and A2 which bundled the anode electrode of OLED24 for every line, and --Am, and having made each current supply source line A1 and A2, the electrical potential differences VA1 and VA2 given to --Am, --VAm into two or more values which are not fixed.
[0048] It explains with reference to the timing diagram which shows actuation of this configuration to drawing 11 . Since it is the same as the gestalt of operation shown in drawing 4 to establish a luminescence period and a quenching period also in this operation gestalt, explanation is omitted.
[0049] After ending the luminescence period of one frame, the electrical potential difference which makes the driver transistor 22 once turn on to the timing of reselection of the gate line 8 in a non-saturation region is applied, and the electrical potential differences VA1 and VA2 given to coincidence by the current supply source line drive circuit 15 at the current supply source lines A1 and A2 and --Am and --VAm are reduced on the low-battery level VAL. The value of the low-battery level VAL is set up lower than the voltage level of the common potential line 9.
[0050] Since the potential of the pixel electrode of OLED24 will be set to the voltage level of the abbreviation common potential line 9 if the current supply source lines A1 and A2, the electrical potential differences VA1 and VA2 of --Am, --VAm are made into the low-battery level VAL, the electrical potential difference of the both ends of OLED24 becomes the sense and reverse of bias at the time of luminescence. At this time, if the turn-off of the driver transistor 22 is carried out, this reverse bias impression condition will be maintained over a quenching period. Such electrical-potential-difference impression is realizable by connecting the current supply source line 10 in parallel with the gate line 8 in the shape of a stripe.
[0051] If it continues impressing a direct current of forward bias, space charge etc. will be generated gradually, brightness will fall, but since OLED24 can bar space charge generation if reverse bias impression is carried out like the gestalt of this operation, it is made long lasting.
[0052] Formation of the stripe-like current supply source line 10 in the gestalt of operation shown in drawing 8 and drawing 10 is explained using drawing 12 and drawing 13 . The cross-section structure which met drawing 12 in the planar structure of the picture element part of an image display device 1 at A-A' of drawing 12 is shown in drawing 13 .
[0053] The island-shape silicone film for forming the switch transistor 21 and the driver transistor 22 is formed in a glass substrate 6, and gate dielectric film is formed in the front face. On gate dielectric film, a gate electrode, the gate line 8, and the electrode for storage capacitance 23 are formed, and a source drain field is formed in self align after that at a gate electrode. The 1st interlayer insulation film 30 is formed in after an appropriate time, and the data line 7, the common potential line 9, and the electrode for storage capacitance 23 are formed through the contact hole.
[0054] Furthermore, after preparing cathode 24K of OLED24 which is a pixel electrode, and organic layer 24O through the contact hole of the 2nd interlayer insulation film 31, the current supply source line 10 which connects transparent anode plate 24when it is counterelectrode A, and this (it connected and covered) is formed. This current supply source line 10 makes it have extended in the direction in which a line writing direction 8, i.e., a gate line, extends.
[0055] The OLED light emitting device 24 makes cathode 24K which consist of metal membranes, such as lithium content aluminum connected on the metal layer connected to the drain of the driver transistor 22, or calcium, organic-semiconductor layer 24O, and transparence anode plate 24A by the indium content oxide film the structure which carried out the laminating.

[0056] Other examples driven with the gestalt of operation shown in drawing 14 at drawing 8 are shown. The driver voltage wave of the electrical potential differences VA1 and VA2 of that the luminescence period and the quenching period are established by 1:3 and the current supply source line 10 and --VAm serving as the low-battery level VAL during a quenching period is the same so that clearly [drawing 14] as compared with drawing 11 .
[0057] The description is in the data driver voltage by the gestalt of drawing 14 to make the voltage level when carrying out the turn-off of the driver transistor 22 still lower than VDL, and make it especially lower than the potential of the common potential line 9 or a pixel electrode from impression of the turn-on electrical potential difference of the driver transistor 22 synchronized with the gate reselection pulse.
[0058] When the electrical potential difference of the gate line 8 is changed into the condition of not choosing, in this condition, the gate voltage of the driver transistor 22 will be kept lower than the electrical potential difference of a source drain. That is, at the time of luminescence, negative gate voltage will be impressed at the time of quenching, and the driver transistor 22 which was being driven with forward gate voltage can prevent display image quality degradation accompanying the property shift and it by the charge impregnation to the gate dielectric film of a transistor.
[0059] As mentioned above , since the quenching period which carry out quenching of the electro-optics component after the scan of two or more gate lines be form , and he be try to drive a pixel , in order that the image display device of this invention may display one image , and the integral of a white background be lose at the time of the look migration during this quenching period , dotage of an edge , i.e. , the display property of an animation , be improve sharply .
[0060] Moreover, the display property of an animation can be raised with the gestalt of above-mentioned operation, without changing the configuration of the pixel generally used to a active-matrix drive, since the quenching scan is carried out after luminescence scan termination.
[0061] Furthermore, since it is made to carry out reverse bias impression at OLED24 and space charge generation can be barred, it can do long lasting, and the small image display device of display brightness degradation can be obtained.
[0062] in addition, this invention is not limited to the gestalt of above-mentioned operation, as shown in drawing 15 , it uses the driver transistor 22 as a P channel mold, and it comes out not to mention this invention being applicable also with the structure which takes out light from a substrate 6 side.
[0063] Moreover, in short, although the gestalt of above-mentioned operation forms the quenching period which carries out quenching of the electro-optics component within the one-frame period which displays one image, in order to display one image, it is clear that what is necessary is just to form the quenching period which carries out quenching of the electro-optics component after the scan of two or more gate lines.
[0064]
[Effect of the Invention] since the quenching period which carry out quenching of the electro-optics component after a scan of two or more gate lines be form , and he be try to drive a pixel , in order that this invention may display one image , as state above , and the integral of a white background be lose at the time of the look migration during this quenching period , dotage of an edge , i.e. , the display property of an animation , can be raise sharply .

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing an example of the image display device of this invention.
[Drawing 2] It is the representative circuit schematic of a active matrix.
[Drawing 3] It is an example Fig. of the pixel of a active-matrix drive.
[Drawing 4] It is the block diagram showing one example of this invention.
[Drawing 5] It is a timing diagram for explaining drive actuation of this invention.
[Drawing 6] It is drawing which explains edge dotage of the animation in a drive conventionally.
[Drawing 7] It is drawing which explains a dissolution for edge dotage of the animation by this invention.
[Drawing 8] It is the block diagram showing other one example of this invention.
[Drawing 9] It is drawing for explaining the configuration of drawing 8 .
[Drawing 10] It is the representative circuit schematic of the active matrix in other examples of this invention.
[Drawing 11] It is a timing diagram for explaining drive actuation of other examples of this invention.
[Drawing 12] It is drawing explaining the planar structure of the picture element part of the image display device by this invention.
[Drawing 13] It is drawing for explaining the cross-section structure of the picture element part of the image display device by this invention.
[Drawing 14] It is a timing diagram for explaining other drive actuation in other examples of this invention.
[Drawing 15] It is drawing explaining other examples of cross-section structure of the picture element part of the image display device which applies this invention.
[Description of Notations]
1 [-- A scan drive circuit 5 / -- A current supply source drive circuit, 6 / -- A substrate, 7 / -- The data line, 8 / -- A gate line, 9 / -- A common potential line, 10 / -- A current supply source line, 20 / -- A pixel, 21 / -- A switch transistor, 22 / -- A driver transistor, 23 / -- Storage capacitance, 24 / -- OLED light emitting device.] -- An image display device, 2 -- A display, 3 -- A data drive circuit, 4

[Translation done.]

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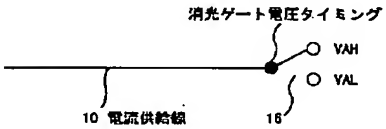
DRAWINGS

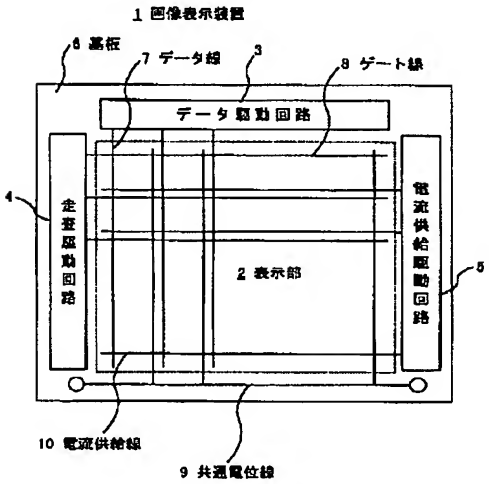
[Drawing 9]

図 9



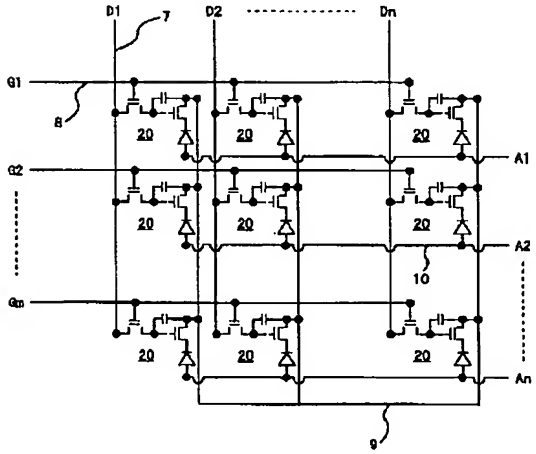
[Drawing 1]

図 1



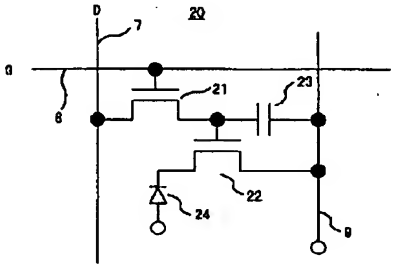
[Drawing 2]

図 2



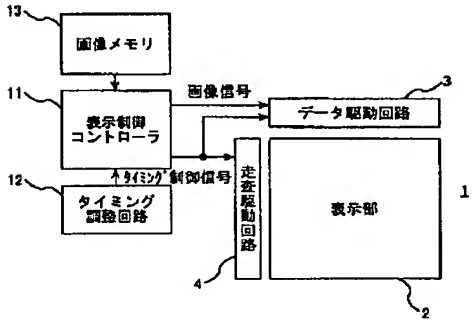
[Drawing 3]

図 3



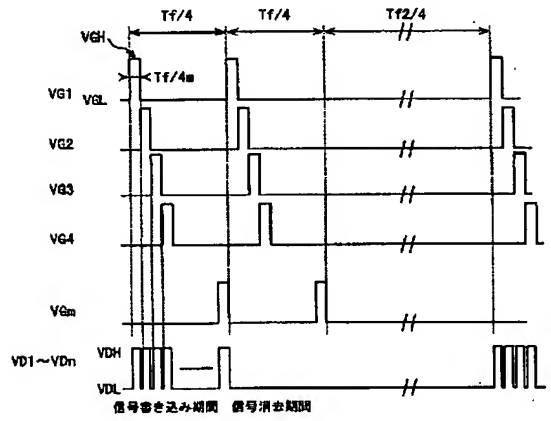
[Drawing 4]

図 4



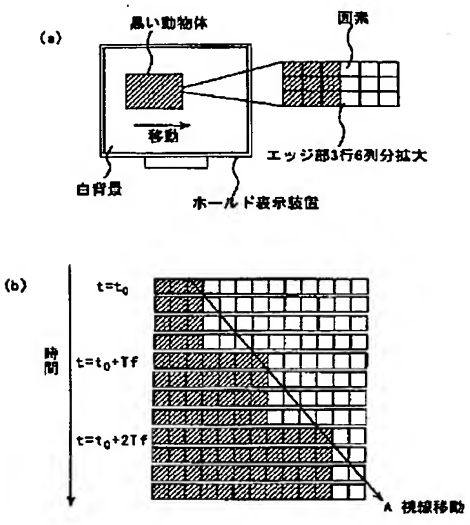
[Drawing 5]

図 5



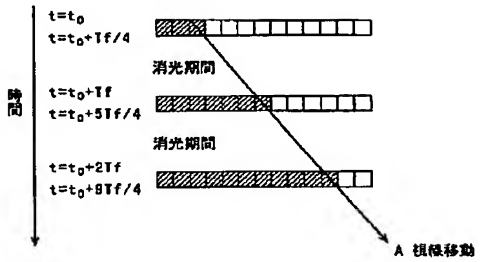
[Drawing 6]

図 6



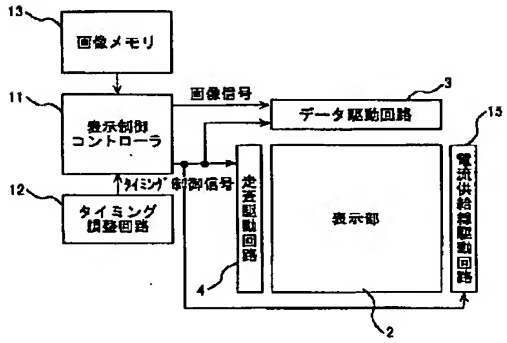
[Drawing 7]

図 7



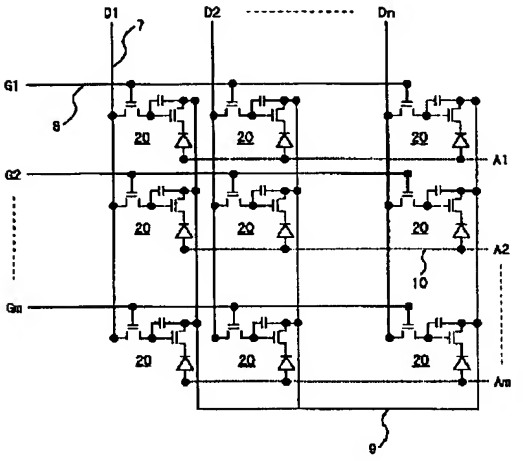
[Drawing 8]

図 8



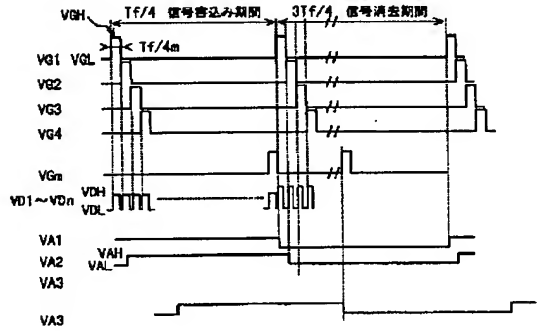
[Drawing 10]

図 10



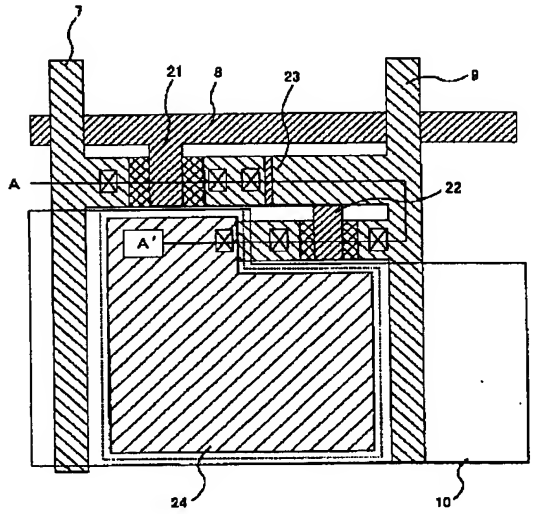
[Drawing 11]

図 11



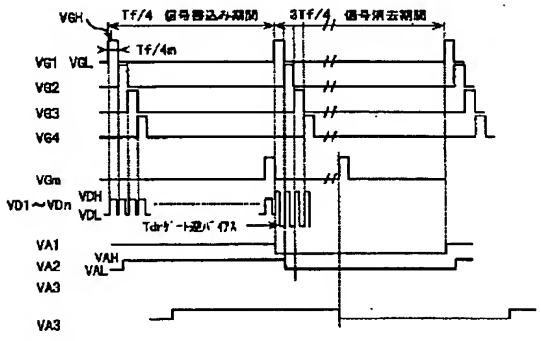
[Drawing 12]

図 12



[Drawing 14]

図 14



[Drawing 13]

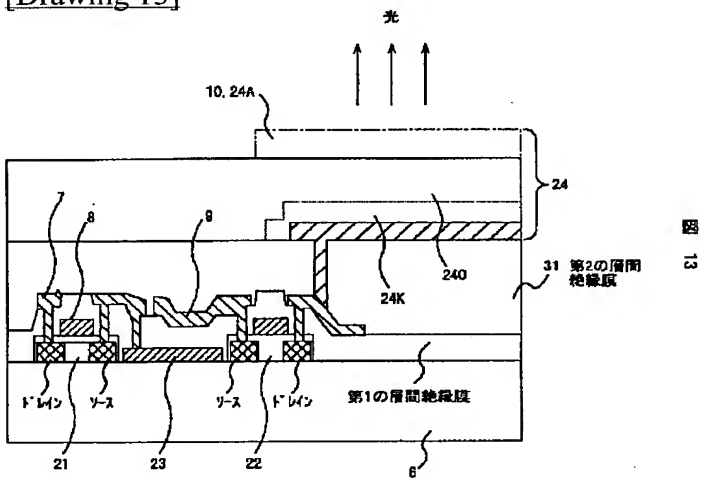


図 13

[Drawing 15]

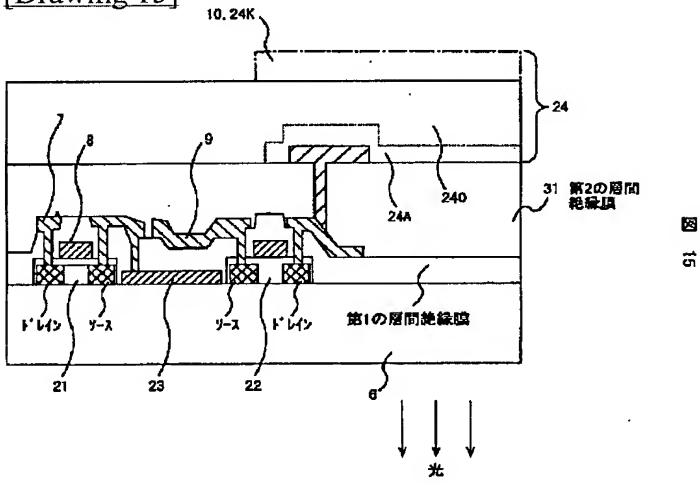


図 15

[Translation done.]